

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Discuss the principles, applications and maintenance requirements of Autoclave, Hot Air Oven and Incubator.
17. Elaborate on the principle and instrumentation of UV-Vis spectroscopy and its applications.
18. Investigate the theory, instrumentation and applications of TLC.
19. Evaluate the principles, instrumentation, and applications of MRI in imaging anatomical structures.
20. Discuss the principles, instrumentation and applications of spectrofluorimetry.



APRIL/MAY 2024

**23UEMB22 — BIO INSTRUMENTATION
(Elective)**

Time : Three hours

Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. List out some of the buffers of biological importance.
2. Compare the principles of the hot air oven and autoclave.
3. Analyze the motive behind using UV spectroscopy over colorimeter in quantitative analysis.
4. Recall the applications of infrared spectroscopy.
5. Explain the basic principle of agarose gel electrophoresis (AGE).
6. Distinguish between paper and thin layer chromatography.
7. Name the key components of an MRI.

8. Match the following.

Imaging Technique

Applications

- | | | |
|--------------|---|--|
| (a) ECG | - | (i) Detecting cancer |
| (b) EEG | - | (ii) Diagnosing heart rhythm abnormalities |
| (c) CT scan | - | (iii) Monitoring brain activity during anaesthesia |
| (d) PET Scan | - | (iv) Diagnosing abdominal conditions |

9. Explain the primary principle behind the functioning of a spectrofluorimeter.

10. Illustrate the diagram of the Geiger muller counter.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Evaluate the differences between preparative, analytical and ultra-centrifugation techniques.

Or

- (b) Discuss Molarity, molality and normality.

12. (a) Analyze the principle, instrumentation and applications of the colorimeter.

Or

- (b) Outline the basic principles of Mass Spectrometry and its applications with a diagram.

- (a) Discuss the applications and limitations of column chromatography.

Or

- (b) Explain the principle of HPLC.

14. (a) Describe the principles, instrumentation and applications of PET scans.

Or

- (b) Discuss the clinical applications of ECG and EEG.

15. (a) Outline the process of calibrating a scintillation counter for accurate radiation detection.

Or

- (b) Explain the differences between film-based and digital autoradiography techniques.

